

What is claimed is:

1. An isolated polynucleotide that encodes:
  - (i) a polypeptide comprising an amino acid sequence that is homologous to the amino acid sequence of a *Helicobacter* polypeptide, wherein said amino acid sequence of said *Helicobacter* polypeptide is selected from the group consisting of the amino acid sequences as shown:
    - in SEQ ID NO:2, beginning with an amino acid in any one of the positions from -20 to 5, and ending with an amino acid in position 279 (GHPO 1360); and
    - in SEQ ID NO:4, beginning with an amino acid in position 1 and ending with an amino acid in position 399 (GHPO 750); or
  - (ii) a derivative of said polypeptide encoded by said polynucleotide.
2. An isolated polynucleotide that encodes:
  - (i) a polypeptide comprising an amino acid sequence that is homologous to an amino acid sequence selected from the group consisting of the amino acid sequences as shown:
    - in SEQ ID NO:2, beginning with an amino acid in position -20 and ending with an amino acid in position 279 (GHPO 1360); and
    - in SEQ ID NO:4, beginning with an amino acid in position 1 and ending with an amino acid in position 399 (GHPO 750); or
  - (ii) a derivative of said polypeptide encoded by said polynucleotide.
3. The isolated polynucleotide of claim 1, which encodes the mature form of:

(i) a polypeptide comprising an amino acid sequence that is homologous to an amino acid sequence selected from the group consisting of the amino acid sequences as shown:

- in SEQ ID NO:2, beginning with an amino acid in position -20 and ending with an amino acid in position 279 (GHPO 1360); and
  - in SEQ ID NO:4, beginning with an amino acid in position 1 and ending with an amino acid in position 399 (GHPO 750); or
- (ii) a derivative of said polypeptide.

4. The isolated polynucleotide of claim 1, 2, or 3, wherein the polynucleotide is a DNA molecule.

5. The isolated polynucleotide of claim 1, which is a DNA molecule that can be amplified and/or cloned by polymerase chain reaction from an *Helicobacter* genome using either:

- A 5' oligonucleotide primer comprising a sequence as shown in SEQ ID NO:14 and a 3' oligonucleotide primer comprising a sequence as shown in SEQ ID NO:15;
- A 5' oligonucleotide primer comprising a sequence as shown in SEQ ID NO:16 and a 3' oligonucleotide primer having a sequence as shown in SEQ ID NO:17; or
- A 5' oligonucleotide primer comprising a sequence as shown in SEQ ID NO:18 and a 3' oligonucleotide primer having a sequence as shown in SEQ ID NO:15.

6. The isolated DNA molecule of claim 5, which can be amplified and/or cloned by the polymerase chain reaction from a *Helicobacter pylori* genome.

7. The isolated polynucleotide of claim 1, which is a DNA molecule that encodes the mature form or a derivative of a polypeptide encoded by the DNA molecule of claim 5.

8. The isolated polynucleotide of claim 1, which is a DNA molecule that encodes the mature form or a derivative of a polypeptide encoded by the DNA molecule of claim 6.

9. A compound, in a substantially purified form, that is the mature form or a derivative of a polypeptide comprising an amino acid sequence that is homologous to a *Helicobacter* polypeptide having a sequence that is selected from the group consisting of the amino acid sequences as shown:

- in SEQ ID NO:2, beginning with an amino acid in position -20 and ending with an amino acid in position 279 (GHPO 1360); and
- in SEQ ID NO:4, beginning with an amino acid in position 1 and ending with an amino acid in position 399 (GHPO 750).

10. The compound of claim 9, which is the mature form or a derivative of a polypeptide encoded by a DNA molecule of claim 5.

11. The compound of claim 9, which is the mature form or a derivative of a polypeptide encoded by a DNA molecule of claim 6.

12. A method of preventing or treating *Helicobacter* infection in a mammal, said method comprising administering to said mammal a prophylactically or therapeutically effective amount of a compound of claim 9, 10, or 11.

13. The method of claim 12, further comprising administering an antibiotic, an antisecretory agent, a bismuth salt, or a combination thereof.

14. The method of claim 13, wherein said antibiotic is selected from the group consisting of amoxicillin, clarithromycin, tetracycline, metronidazole, and erythromycin.

15. The method of claim 13, wherein said bismuth salt is selected from the group consisting of bismuth subcitrate and bismuth subsalicylate.

16. The method of claim 13, wherein said antisecretory agent is a proton pump inhibitor.

17. The method of claim 16, wherein said proton pump inhibitor is selected from the group consisting of omeprazole, lansoprazole, and pantoprazole.

18. The method of claim 13, wherein said antisecretory agent is an H<sub>2</sub>-receptor antagonist.

19. The method of claim 18, wherein said H<sub>2</sub>-receptor antagonist is selected from the group consisting of ranitidine, cimetidine, famotidine, nizatidine, and roxatidine.

20. The method of claim 13, wherein said antisecretory agent is a prostaglandin analog.

21. The method of claim 20, wherein said prostaglandin analog is misoprostol or enprostil.

22. The method of claim 12, which further comprises administering a prophylactically or therapeutically effective amount of a second *Helicobacter* polypeptide or a derivative thereof.

23. The method of claim 22, wherein the second *Helicobacter* polypeptide is a *Helicobacter* urease, a subunit, or a derivative thereof.

24. A composition comprising a compound of claim 9, 10, or 11, together with a physiologically acceptable diluent or carrier.

25. The composition of claim 24, further comprising an adjuvant.

26. The composition of claim 24, further comprising a second *Helicobacter* polypeptide or a derivative thereof.

27. The composition of claim 26, wherein said second *Helicobacter* polypeptide is a *Helicobacter* urease, or a subunit or a derivative thereof.

28. A method of preventing or treating *Helicobacter* infection in a mammal, said method comprising administering to said mammal a prophylactically or therapeutically effective amount of a polynucleotide of claim 1, 2, or 3.

29. A method of preventing or treating *Helicobacter* infection in a mammal, said method comprising administering to said mammal a prophylactically or therapeutically effective amount of a polynucleotide of claim 5, 6, or 7.

30. A method of preventing or treating *Helicobacter* infection in a mammal, said method comprising administering to said mammal a prophylactically or therapeutically effective amount of a polynucleotide of claim 8.

31. A composition comprising a viral vector, in the genome of which is inserted a DNA molecule of claim 4, said DNA molecule being placed under conditions for expression in a mammalian cell and said viral vector being admixed with a physiologically acceptable diluent or carrier.

32. The composition of claim 31, wherein said viral vector is a poxvirus.

33. A composition that comprises a bacterial vector comprising a DNA molecule of claim 4, said DNA molecule being placed under conditions for expression and said bacterial vector being admixed with a physiologically acceptable diluent or carrier.

34. The composition of claim 33, wherein said vector is selected from the group consisting of *Shigella*, *Salmonella*, *Vibrio cholerae*, *Lactobacillus*, Bacille bilié de Calmette-Guérin, and *Streptococcus*.

35. A composition comprising a polynucleotide of claim 1, 2, or 3, together with a physiologically acceptable diluent or carrier.

36. The composition of claim 35, wherein said polynucleotide is a DNA molecule that is inserted in a plasmid that is unable to replicate and to substantially integrate in a mammalian genome and is placed under conditions for expression in a mammalian cell.

37. An expression cassette comprising a DNA molecule of claim 4, said DNA molecule being placed under conditions for expression in a procaryotic or eucaryotic cell.

38. A process for producing a compound of claim 9, which comprises culturing a procaryotic or eucaryotic cell transformed or transfected with an expression cassette of claim 37, and recovering said compound from the cell culture.

39. A method of preventing or treating *Helicobacter* infection in a mammal, said method comprising administering to said mammal a prophylactically or therapeutically effective amount of an antibody that binds to the compound of claim 9, 10, or 11.